

**FABRICATION AND USE OF SEMIPERMEABLE MEMBRANES
AND GELS FOR THE CONTROL OF ELECTROLYSIS**

ABSTRACT OF THE DISCLOSURE

A microfluidic device and method is disclosed having one or more membranes for the control of electrolysis. In one embodiment, a microfluidic device is disclosed that includes body with first channel and second channels separated by a gel layer. A first electrode positioned in the first channel and a second electrode positioned in the second channel wherein a potential applied to the first and second electrodes passes electrons from the first channel to the second channel through the gel layer. In another embodiment, a microfluidic device includes a body having a surface with a channel separating two first reservoirs. One or more membranes are positioned on the surface covering a portion of the channel and a blank is positioned covering the channel and the one or more membranes. A second reservoir through the blank is in contact with the membrane, each second reservoir in communication with the channel via the membrane. A first electrode is positioned in the first reservoir and a second electrode is positioned in the second reservoir wherein a potential applied to the first and second electrodes passes electrons from the first channel to the second channel through the membranes.